

**ABSTRACT OF THE INVENTION**

5 The present invention relates to compositions comprising proteasome inhibitors, such as lactacystin, DPBA and their analogs. These compositions are used for the following purposes: (1) to disrupt mitochondrial function (useful against cancer, inflammation, adverse immune reaction and hyperthyroidism), (2) to disrupt nitric oxide synthesis (useful against inflammation and septic shock), and (3) to reverse ongoing adverse immune reactions, such as autoimmune diseases and graft rejection. In the later case, the compositions can be administered once the patients' T cells are mostly activated. Proteasome inhibitors can also be combined to immuno-suppressinve drugs like rapamycin, cyclosporin A and FK506. Finally, a method for screening a compound having a proteasome inhibition activity is also disclosed and claimed.

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